Behaviour. Usually seen on rocks and rocky bluffs, avoiding trees, but flushed frequently from grass, to which it probably walked from the rocks on which it landed. Two birds in August 1976 seen in small cassava farm on the edge of the grassland. Gait rather creeping, suggestive of *A. spinoletta.*

Numbers. On Mt. Game and 2 minor peaks below it we found evidence of only 4–5 pairs of pipits, a low population considering the area of apparently suitable habitat.

Habitat. The Togo Range is part of a chain of peaks 760–915 m high running from southeast Ghana to northern Benin (formerly Dahomey) where it becomes the Atakora Range. Amedzofe lies at the extreme southern end of this chain.

The summit on which the birds were found was bare of trees (a state which appears to be natural and not man-made) and covered with a variety of coarse tussocky grasses and dwarf herbs. The slopes were scattered with numerous emergent rocks and slabs. On two sides the peak was flanked by sheer rock faces, one a very high cliff, the other a low bluff 6–9 m high. The birds were frequently found on the smaller of the faces. The habitat seems typical of *A. similis* which is 'usually associated with highland grasslands and rocky slopes' (Hall & Moreau 1970). Similar grass-topped summits occur to the northeast of Amedzofe and it seems probable that the bird will be found on any peak in the range which combines open grassland with scattered rocky outcrops.

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Notes on the song, territorial behaviour and the display of the Antillean Crested Hummingbird *Orthorhyncus cristatus exilis* of St. Lucia, W.I.

by Karl-L. Schuchmann

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During a research programme on the hummingbirds of St. Lucia, West Indies in December 1977 and August 1978, morphological and ethological data on the Antillean Crested Hummingbird *Orthorhyncus cristatus exilis* were collected in the southwestern part of the island, the Mt. Gimie area (Edmund Forest Reserve, elevation 1300 m). This sexually dimorphic species (Bond 1961) is the most common hummingbird on St. Lucia and is distributed virtually from sea level to montane rain-forest. It is the smallest

in weight and size of the 3 trochilids on this island. In montane habitats, where regularly all 3 hummingbird species overlap, *O. c. exilis* normally feeds on flowers close to the ground (e.g. *Lantana camara*), while the other two, the Green-throated Carib *Sericotes holosericeus* and the Purple-throated Carib *Eulampis jugularis*, frequently visit flowers from 2 to 3 m above the ground up to the tree tops (e.g. *Spathodea campanulata*).

The mensural and weight characteristics of *O. c. exilis* (Table 1) indicate that females differ significantly from males in wing-length ($p<0.0025$; t-test) and tarsus ($p<0.0005$; t-test).

Table 1

Mensural and weight characteristics of *Orthorhyncus cristatus exilis* of St. Lucia, West Indies.

	Sex	*Mean*	*SD*	*SE*	*Range*	*No.*
Wing (mm)	M	48·9	1·56	0·55	46·0–51·0	8
	F	46·3	0·30	0·58	46·0–46·7	5
Tail (mm)	M	28·9	1·25	0·44	27·0–31·0	8
	F	28·2	0·20	0·54	28·0–28·3	5
Bill (mm)	M	15·2	1·51	0·53	11·8–16·7	8
	F	15·9	0·40	0·18	11·5–16·2	5
Tarsus (mm)	M	3·8	0·30	0·46	3·0–4·0	8
	F	3·1	0·20	0·54	3·0–3·4	5
Weight (g)	M	3·1	0·25	0·09	2·8–3·4	8
	F	3·1	0·10	0·04	3·0–3·2	5

Only the males of *O. c. exilis* establish feeding territories. The females forage along fairly regular routes, 'traplining' many dispersed flowers (Colwell 1973, Feinsinger 1975). During the breeding season from January to August males hold display territories containing a feeding territory (core area) and an outer edge (buffer zone; see Pitelka 1951). The males advertise their presence in their territories by singing (see Fig. 1). Contrastingly, females establish only nesting territories, where they persistently attack intruders. I have never heard a female sing, but have occasionally noted a monosyllabic chase-call.

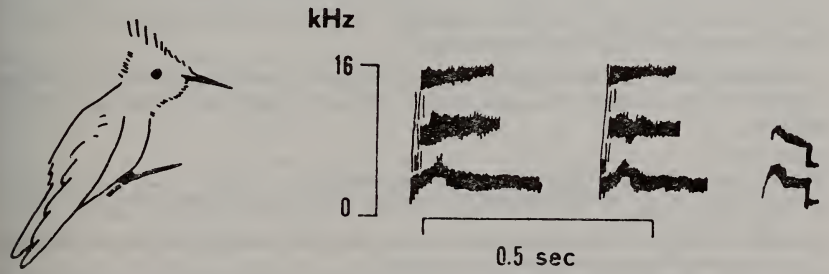

Fig. 1. Singing posture of ♂ *Orthorhyncus cristatus exilis* and sonogram of the song.

At the time of mating the female has already built her nest. Display and copulation take place in the male's territory. A female which enters a display territory is usually treated as a competitor for food and chased away immediately by the male. As soon as the female manages to perch in the

core area of the display territory the male's aggression is eliminated by species-specific behaviour, namely by the female perching motionless in front of him.

The observed display of the male can be divided into 3 different phases before the actual mating takes place (see Fig. 2):

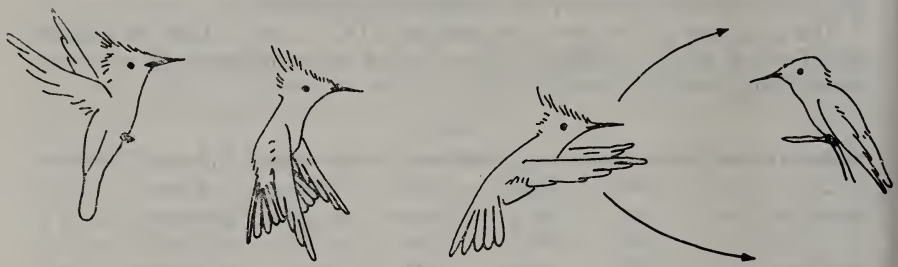

Fig. 2. Display phases of *Orthorhyncus cristatus exilis* (see text).

1) The male hovers with erected green iridescent crest in a vertical position in front of the female about half a metre distant.

2) The male flies in 'slow-motion' at a high wing-beat rate towards the female and abruptly claps the wings against the fanned retrices, producing a mechanical noise.

3) Immediately in front of the perching female the male, still with erected crest, starts flying to and fro at high speed in a semi-circle around the female. At the end of each semi-circle the male again produces a mechanical sound by beating the wings against its widely spread tail-feathers. During this flight pattern of the male, the colour of the iridescent green crest changes in relation to its angle to the female. The iridescence is optimally displayed when the male is exactly centrally in front of the female. The male repeats this flight 4–6 times. During the male's display the female is motionless except for slightly opening the beak in phase 3. Thereupon, the male copulates with the female.

A similar display has been observed with the Wire-crested Thorntail *Popelairia popelairii* (Schuchmann 1976).

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